

## **REMARKS**

Claims 1-45 are pending in the present application. No claims have been amended or cancelled in this response.

In the Office Action mailed March 24, 2005, claims 1-24, 27-30, 33-36, 39 and 40 were rejected. More specifically, the status of the claims in light of this Office Action is as follows:

(A) Claims 1-24 and 27-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,891,796 to Nakamura et al. ("Nakamura") in view of U.S. Patent No. 3,553,417 to Smith et al. ("Smith") and Japan Patent No. 54-158081 to Minami et al. ("Minami");

(B) Claims 30, 33-36, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of Smith, Minami, and U.S. Patent No. 6,336,269 to Eldridge et al. ("Eldridge");

(C) Claims 25, 26, 31, 32, 37 and 38 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form to include the features of the claims from which they depend; and

(D) Claims 41-45 were allowed.

### **A. Response to the Section 103(a) Rejection of Claims 1-24 and 27-29**

Claims 1-24 and 27-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of Smith and Minami. For the reasons described below, the cited references fail to disclose or suggest all the features of these claims.

#### **1. Claim 1 Is Directed to a Method of Wire-Bonding Including Severing a Wire with an Electrical Discharge Between First and Second Electrodes**

Claim 1 is directed to a method of wire-bonding including positioning a first electrode and a second electrode at least proximate to a wire attached to a terminal of

a microelectronic component and severing the wire with an electrical discharge between the first and second electrodes.

2. Nakamura Discloses a Method of Wire-Bonding a Semiconductor Pellet to a Lead Frame

Nakamura discloses a method of wire-bonding a pad of a semiconductor pellet to a lead of a lead frame. The method includes attaching a first end of a wire to the pad and then moving the capillary to attach a section of the wire spaced apart from the first end to the lead. Next, the capillary is raised a predetermined distance from a surface of the lead, and a first clasper is closed to secure the wire. After closing the first clasper, the capillary and the first clasper are raised to cut the wire at the lead. Nakamura's wire-bonding device includes two electrodes for removing a covering film from selected portions of the wire to expose the sections of the wire that are attached to the leads.

3. Smith Discloses a Wire-Bonding and Severing Apparatus

Smith discloses a wire-bonding and severing apparatus for bonding a wire to an article. The apparatus includes an upper welding electrode, a grounded lower welding electrode, and two sparking electrodes positioned adjacent to the upper welding electrode. After welding a first portion of the wire to the article, a high intensity spark arcs across the gap between the first sparking electrode and a leading edge portion of the wire projecting from the article to sever off the leading edge portion of the wire. After the entire wire is welded to the article, another high intensity spark arcs across the gap between the second sparking electrode and a trailing edge portion of the wire projecting from the article to sever off the trailing edge portion of the wire.

4. Minami Discloses a Method for Cutting Lead-in Wires

Minami discloses a method for cutting lead-in wires that project outward from the ends of a glass tube of an annular fluorescent lamp. The method includes melting the wires with "a gas burner or inter-electrode arc, so that the tip ends of the wires 2 become spherical bodies 6." (Minami, Abstract.)

5. Nakamura, Smith, and Minami Fail to Disclose or Suggest Severing a Wire with an Electrical Discharge Between First and Second Electrodes

Nakamura, Smith, and Minami fail to disclose or suggest a method of wire-bonding including, *inter alia*, "severing the wire with an electrical discharge between the first and second electrodes" in which the wire is "attached to a terminal of the microelectronic component," as recited in claim 1. As the Examiner correctly notes, Nakamura's device includes two electrodes that remove a covering film from the wire but do not sever the wire. The Examiner alleges, however, that it would have been obvious to adapt Nakamura's device in view of Smith and Minami so that Nakamura's electrodes sever the wire and create a ball at the end of the wire. Applicants disagree.

One of ordinary skill in the art would not be motivated to modify Nakamura's device as suggested by the Examiner because such a modification would have several disadvantages and because Smith teaches away from such a modification. Specifically, if Nakamura's device were modified so that Nakamura's electrodes generate an electrical discharge to heat and sever the wire at a distance spaced apart from the lead, the resulting wire-bond would have a first portion extending between the semiconductor pellet and the lead and a second portion or "tail" projecting from the lead. A wire-bond with such a configuration is disadvantageous because the tail consumes space and may cause a short. Moreover, Smith specifically teaches away from such a configuration. For example, Smith states, "the wire most advantageously is severed adjacent the weld to avoid the presence of any excess or 'tail' portion of the wire projecting from this article." (Smith 1:14-16.)

Alternatively, if Nakamura's device were modified so that Nakamura's electrodes generate an electrical discharge to heat and sever the wire at the lead to avoid a tail, the heat could cause the wire to detach from the lead and render the wire-bond defective. Accordingly, one of ordinary skill in the art would not be motivated to modify Nakamura's device so that the wire is severed between the electrodes because such a modification would have several disadvantages and because Smith teaches away from

such a modification. Therefore, the Section 103(a) rejection of claim 1 should be withdrawn.

Claims 2-9 depend from claim 1. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons discussed above with reference to claim 1 and for the additional features of these claims.

Independent claim 10 has, *inter alia*, features generally analogous to those included in claim 1. Accordingly, the Section 103(a) rejection of claim 10 should be withdrawn for the reasons discussed above with reference to claim 1 and for the additional features of these claims.

Claims 11-17 depend from claim 10. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons discussed above with reference to claim 10 and for the additional features of these claims.

Independent claim 18 has, *inter alia*, features generally analogous to those included in claim 1. Accordingly, the Section 103(a) rejection of claim 18 should be withdrawn for the reasons discussed above with reference to claim 1 and for the additional features of this claim.

Claims 19-23 depend from claim 18. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons discussed above with reference to claim 18 and for the additional features of these claims.

Independent claim 24 has, *inter alia*, features generally analogous to those included in claim 1. Accordingly, the Section 103(a) rejection of claim 24 should be withdrawn for the reasons discussed above with reference to claim 1 and for the additional features of this claim.

Claims 27-29 depend from claim 24. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons discussed above with reference to claim 24 and for the additional features of these claims.

B. Response to the Section 103(a) Rejection of Claims 30, 33-36, 39 and 40

Claims 30, 33-36, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of Smith, Minami, and Eldridge. Independent claim 30 has, *inter alia*, features generally analogous to those included in claim 1. Accordingly, claim 30 is patentable over Nakamura, Smith, and Minami for the reasons discussed above with reference to claim 1 and for the additional features of claim 30. Moreover, Eldridge fails to cure the above-noted deficiencies of Nakamura, Smith, and Minami to support a *prima facie* case of obviousness under Section 103(a). For example, Eldridge does not provide a motivation to modify Nakamura's device so that Nakamura's electrodes generate an electrical discharge to heat and sever the wire. Accordingly, the Section 103(a) rejection of claim 30 should be withdrawn.

Claims 33-35 depend from claim 30. Accordingly, the Section 103(a) rejection of these claims should be withdrawn for the reasons discussed above with reference to claim 30 and for the additional features of these claims.

Independent claim 36 has, *inter alia*, features generally analogous to those included in claim 30. Accordingly, the Section 103(a) rejection of claim 36 should be withdrawn for the reasons discussed above with reference to claim 30 and for the additional features of claim 36.

Claims 39 and 40 depend from claim 36. Accordingly, the Section 103(a) rejection of claims 39 and 40 should be withdrawn for the reasons discussed above with reference to claim 36 and for the additional features of these claims.

C. Response to Claim Objections

Claims 25, 26, 31, 32, 37 and 38 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form to include the features of the claims from which they depend. Claims 25, 26, 31, 32, 37 and 38 have not been amended because the Section 103(a) rejection of their respective independent claims should be withdrawn. Accordingly, the objection to claims 25, 26, 31, 32, 37 and 38 should be withdrawn.

D. Conclusion

In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. § 112 and patentably define over the applied art. A Notice of Allowance is, therefore, respectfully requested. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-6465.

Respectfully submitted,

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Date: June 23, 2005

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